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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/761,381

01/22/2004

Shinji Murai

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ALEXANDRIA, VA 22314

EXAMINER

TRINH, THANH TRUC

ART UNIT

PAPER NUMBER

1795

NOTIFICATION DATE

DELIVERY MODE

02/08/2008

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/761,381	Applicant(s) MURAI ET AL.	
	Examiner THANH-TRUC TRINH	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 January 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7 and 9-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 and 9-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/ are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 1/16/2008 has been entered.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 1, 4 and 11-14 are rejected under 35 U.S.C. 102(b) as being anticipated by Kang et al. ("Enhanced Stability of Photocurrent-Voltage Curves in Ru(II)-Dye-Sensitized Nanocrystalline TiO₂ Electrodes with Carboxylic Acids", Journal of the Electrochemical Society, Vol. 147 (8), 2000, pages 3049-3053).

Regarding claims 1, 4, 11-14, Kang et al. discloses a dye-sensitized solar cell comprising a semiconductor electrode containing a dye (ITO, TiO₂ particles and RuL₂(NCS)₂·2H₂O) and a carboxylic compound, wherein the dye and the carboxylic

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compound are carried on a surface of the semiconductor electrode; a counter electrode (Pt); an electrolyte composition provided between the semiconductor electrode and the counter electrode and containing an electrolyte that contains iodine (I_2) and molten salt of iodide (or inorganic salt LiI_2 in solvent acetonitrile - See "Experimental" and "Results and Discussion" sections of Kang et al.). Kang et al. further teaches the carboxylic compound is selected from the group of acetic acid, butyric acid, benzoic acid. (See Table 1 on page 3052). It is the Examiner's position that the electrolyte composition (LiI and I_2 in acetonitrile) is substantially in the form of a liquid because the solvent acetonitrile is substantially in the form of a liquid at room temperature.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

2. Claims 2-3, 6-7 and 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kang et al. in view of Gaudiana et al. (US Application Publication 20030188777)

Regarding claims 2-3, Kang et al. teaches a dye-sensitized as described in claim 1. Kang et al. also suggests including gelling molecules. (See 1st paragraph of 2nd column on page 3049)

However, Kang et al. does not specifically use the gelling agent (or molecules) such as polyvinyl pyridine in the experiment.

Gaudiana et al. teaches including a gelling agent such as polyvinyl pyridine in the electrolyte composition. (See paragraph 0081).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of Kang et al. by including gelling agent such as polyvinyl pyridine as taught by Gaudiana et al., because Kang et al. suggests using gelling molecules to improve stability (See 1st paragraph of 2nd column on page 3049 of Kang et al.) and Gaudiana et al. teaches gelling agent is used to gel a suitable electrolyte solution. (See paragraph 0081 of Gaudiana et al.)

Regarding claims 6-7, Kang et al. teaches a dye-sensitized solar cell as described in claim 1.

Kang et al. does not specifically teach using molten salt of iodide includes iodide of nitrogen-containing heterocyclic compound; or 1-methyl-3-propyl imidazolium iodide.

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Gaudiana et al. teaches using molten salt of iodide includes iodide of nitrogen-containing heterocyclic compound such as methylpropylimidazolium iodide, methylbutylimidazolium iodide, etc. (See paragraph 0080). Gaudiana et al. also teaches the molten salt iodide includes 1-methyl-3-propyl imidazolium iodide (See Examples 11-12 and paragraph 0096).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the solar cell of Kang et al. by using molten salt of iodide of nitrogen-containing heterocyclic compound or 1-methyl-3-propyl imidazolium as taught by Gaudiana et al. in the electrolyte, because Gaudiana et al. teaches that it would enhance the efficiency of the solar cell. (See Table 5 of Gaudiana et al.).

Regarding claims 9-10, Kang et al. teaches a dye-sensitized solar cell as described in claim 1.

Kang et al. does not specifically teach the electrolyte further contains water and the content of water is in the range from 0.01 wt% to 10 wt%.

Gaudiana et al. teaches including water in the electrolyte, wherein the content of water is either 0.5 wt% or 1.0 wt%, which is well within the instant range. (See paragraphs 0081-0110)

It would have been obvious to one skilled in the art at the time the invention was made to modify the solar cell of Kang et al. by including 0.5 wt% or 1.0 wt% of water in the electrolyte composition as taught by Gaudiana et al., because Gaudiana et al.

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teaches such electrolyte composition would enhance the charge transfer efficiency of the solar cell. (See paragraph 0002)

3. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kang et al. in view of Wariishi et al. (US Patent 6376765).

Kang et al. teaches a dye-sensitized solar cell as described in claim 1.

Kang et al. does not teach using electrolyte composition having viscosity-lowering agent containing at least one compound selected from the group consisting of salt of nitrogen-containing heterocyclic compound and salt of aliphatic compound.

Wariishi et al. teaches using electrolyte containing salt of nitrogen-containing heterocyclic compound (See Formula 4 and col. 8 lines 61-69 and col. 9 lines 1-16).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of Kang et al. by using electrolyte composition containing salt of nitrogen-containing heterocyclic compound as taught by Wariishi et al., because Wariishi et al. teaches that it would provide an excellent durability and photoelectric conversion properties. (See col. 1 lines 58-63 of Wariishi et al.)

Response to Arguments

Applicant's arguments with respect to claims 1-7 and 9-14 have been considered but are moot in view of the new ground(s) of rejection.

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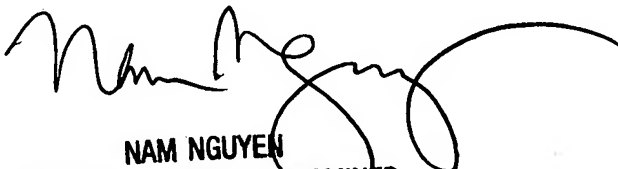
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to THANH-TRUC TRINH whose telephone number is (571)272-6594. The examiner can normally be reached on 8:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

TT
1/29/2008


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